



CONDITION OF TEXAS PAVEMENTS

PMIS Annual Report FY 2018-2021



CONDITIONS OF TEXAS PAVEMENTS

Pavement Management Information System (PMIS)

Annual Report | FY 2018-2021



MAINTENANCE DIVISION | PAVEMENT PRESERVATION BRANCH

September 1, 2021

Condition of Texas Pavements Summary

PMIS Annual Report, FY 2018-2021

This report describes the condition of Texas pavements in Fiscal Year 2021 and during the four-year FY 2018-2021 period, based on analysis of Pavement Management Information System (PMIS) distress ratings and ride quality measurements. The report includes the percentage of lane miles in “Good” or better condition, trends for the major highway systems (IH, US, SH, and FM) and pavement types (ACP, CRCP, and JCP), trends for pavement distress types, and maintenance level of service information.

FY 2021 is the fourth year that PMIS data was collected statewide by one vendor using automated/semi-automated methods and in the fall and winter seasons.

Percentage of Lane Miles in “Good” or Better Condition

89.31 percent of Texas pavements are in “Good” or better condition, up from **88.80 percent** in FY 2020. This is the fourth improvement in pavement condition percentage in the last four years. It is higher than the 84.22 percent in the base year of FY2002 (the Texas Transportation Commission established the statewide pavement condition goal in August 2001).

Substandard Condition Scores

Substandard Condition Score reports show distress types that need to be fixed to increase the percentage of lane miles in “Good” or better condition. ACP Ride Quality was still the biggest cause of mileage not being in “Good” or better condition in FY 2021.

Substandard mileage of ACP Block Cracking, ACP Longitudinal Cracking, ACP Transverse Cracking, and ACP Ride increased in FY 2021. CRCP Asphalt Concrete Patching, CRCP Portland Concrete Patching, and CRCP Ride had more substandard lane mileage in FY 2021. JCP Failure, JCP Slab with Longitudinal Cracks, JCP Portland Concrete Patching, and JCP Ride exhibited more substandard lane miles.

Statewide Trends Based on Percentage “Good” or Better: FY 2018-2021

| Fiscal Year 2020-2021 | Condition Score | Ride Score | Distress Score | Shallow Distress | Deep Distress |
|-----------------------|-----------------|------------|----------------|------------------|---------------|
| Statewide | ▲ | ▼ | ▲ | ▲ | ▲ |
| IH | ▲ | ▼ | ▲ | ▼ | ▲ |
| US | ▲ | ▼ | ▲ | ▼ | ▲ |
| SH | ▲ | ▼ | ▲ | ▼ | ▲ |
| FM | ▲ | ▼ | ▲ | ▲ | ▲ |
| ACP | ▲ | ▼ | ▲ | ▲ | ▲ |
| CRCP | ▼ | ▲ | ▼ | ▼ | ▲ |
| JCP | ▼ | ▼ | ▼ | ▲ | ▼ |

Pavement Distress Trends for FY 2018-2021

| Pavement Type | Distress | Percentage of Lane Miles with Distress |
|---------------|--------------------------------|--|
| ACP | Shallow Rutting | Less |
| | Deep Rutting | Less |
| | Alligator Cracking | Same |
| | Failures | Less |
| | Longitudinal Cracking | Less |
| | Transverse Cracking | More |
| | Block Cracking | More |
| | Patching | Less |
| CRCP | Spalled Cracks | More |
| | Punchouts | Less |
| | Asphalt Patches | Less |
| | Portland Concrete Patches | More |
| JCP | Failed Joints and Cracks | Less |
| | Failures | Less |
| | Shattered Slabs | More |
| | Slabs with Longitudinal Cracks | More |
| | Portland Concrete Patches | More |

Maintenance Level of Service Trends for FY 2021

The overall “Combined” level of service maintained on Texas flexible (ACP) pavements improved in FY 2021 because of decreases in the amount of Rutting and Alligator Cracking.

PMIS Total Lane Miles and Data Storage Sample

The total number of lane miles in PMIS slightly increased in FY 2021. PMIS contained 201,225.0 lane miles in FY 2021, up from 198,700.3 lane miles in FY 2020.

PMIS contained Condition Score data on approximately 99.41 percent of all TxDOT-maintained lane miles in FY 2021. This percentage is the highest in the last four years.

Discussion

Overview

The statewide percentage of lane miles in “Good” or better condition increased from 88.80 in FY 2020 to 89.31 percent in FY 2021. This is the highest percentage of Pavements in Good or Better condition in the last four years, and the highest since FY 2001 when the Texas Transportation Commission established the statewide pavement condition goal.

The increase in overall pavement condition in FY 2021 was due to the reduction of distress. Overall, pavement condition score improved to varying extent on all of Interstate Highways (IH), United States Highways (US), and State Highways (SH), and Farm-to-Market (FM) roads. Pavement condition also improved on Asphalt Concrete Pavement (ACP) pavement type. FY 2021 exhibited an increase in the percentage of lane miles in the “Very Good” condition score class that served to offset the decrease in the percentage of lane miles observed in the “Good” class.

FY 2021 was the fourth year TxDOT used one vendor to collect pavement condition data statewide using automated/semi-automated data collection methods utilizing 3D laser technology and high-resolution cameras. Compared to the two different vendors used in FY 2017 the one vendor provided better consistency in the data collected. Overall pavement condition in the energy sector areas improved in FY 2021. This could be due to decreased energy related transportation activities in these areas. Figure 2 shows the change in percent lane miles “Good” or better between FY 2018 and FY 2021 for all the counties in Texas.

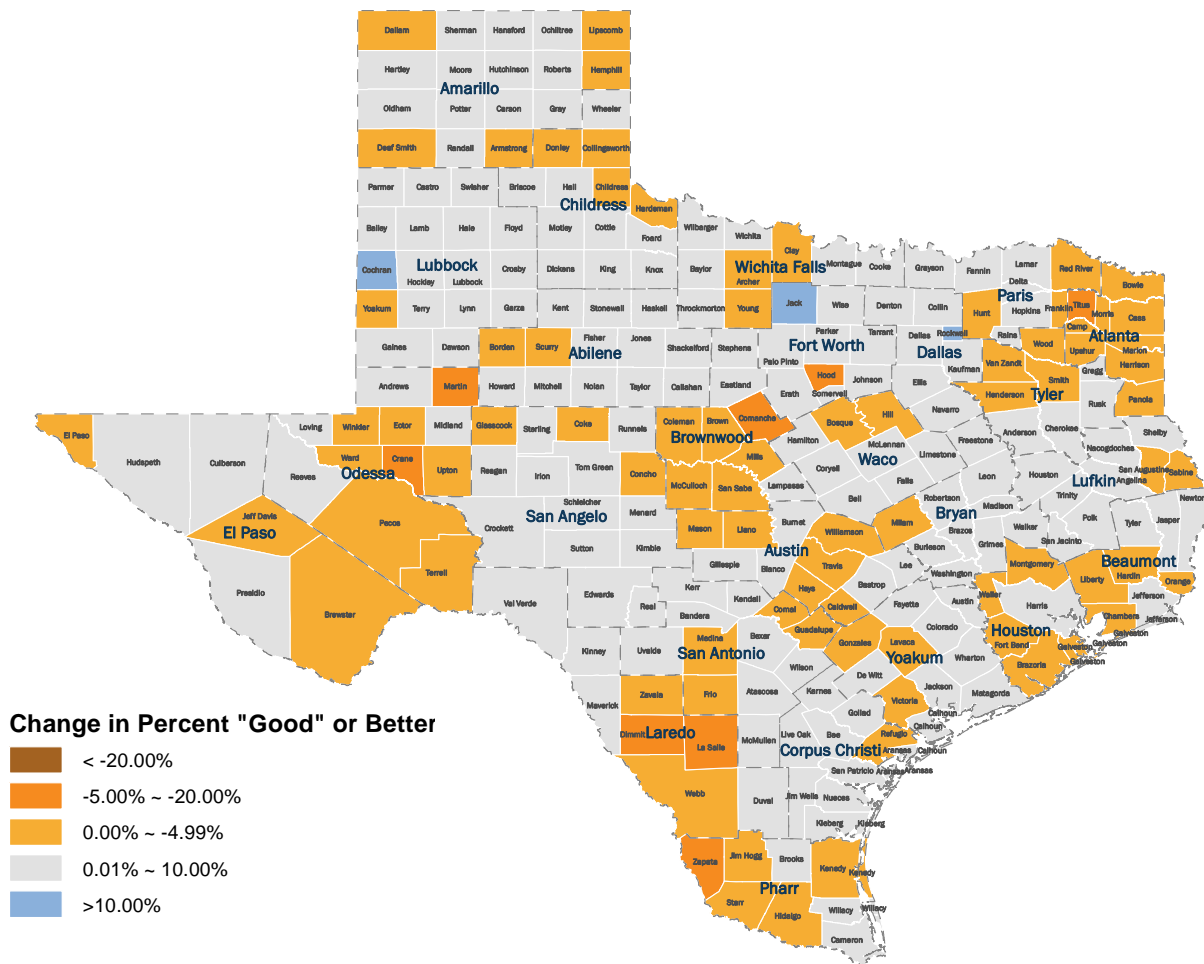


Figure 2. Texas County Percent “Good” or Better Change FY 2018 and FY 2021

Continuing Improvements in Pavement Management Practices

TxDOT continued to improve pavement management, maintenance, and rehabilitation techniques. These management efforts allowed TxDOT to treat additional lane miles, kept the pavement network in overall good condition, and (more importantly) reduced the long-term cost of maintaining pavements. Specific details about these efforts are provided below:

- Starting in FY 2008, TxDOT required each district to produce a Four-Year Pavement Management Plan each year that includes all aspects of pavement-related work. These are project-specific and financially constrained plans which map out the pavement work needed, along with expected changes in pavement condition. This has had the immediate benefit of giving districts a tool to plan out the pavement preservation and maintenance work rather than being reactive to it.
- TxDOT also continued a series of Peer Reviews of each district’s pavement maintenance program that began in FY 2009. The Peer Reviews have made it easier for districts to share “best practices” to use resources to improve the effectiveness of pavement maintenance.

Maintenance Expenditure Fluctuation

Pavement condition relies heavily on maintenance and rehabilitation expenditures. Figure 3 shows the general trend of the percentage of lane miles in “Good” or better condition and the total maintenance and rehabilitation expenditure since FY 2006. In addition to the Category 1 funding and maintenance expenditure, district discretionary funds continued to be used in road projects to improve pavement performance. Furthermore, Proposition 1 and Proposition 7 funding initiatives contributed to the additional available funding to address maintenance and rehabilitation needs in the last few years. Even though expenditure declined in FY 2021, Texas roads improved mainly due to the reduction in traffic during COVID-19 pandemic.

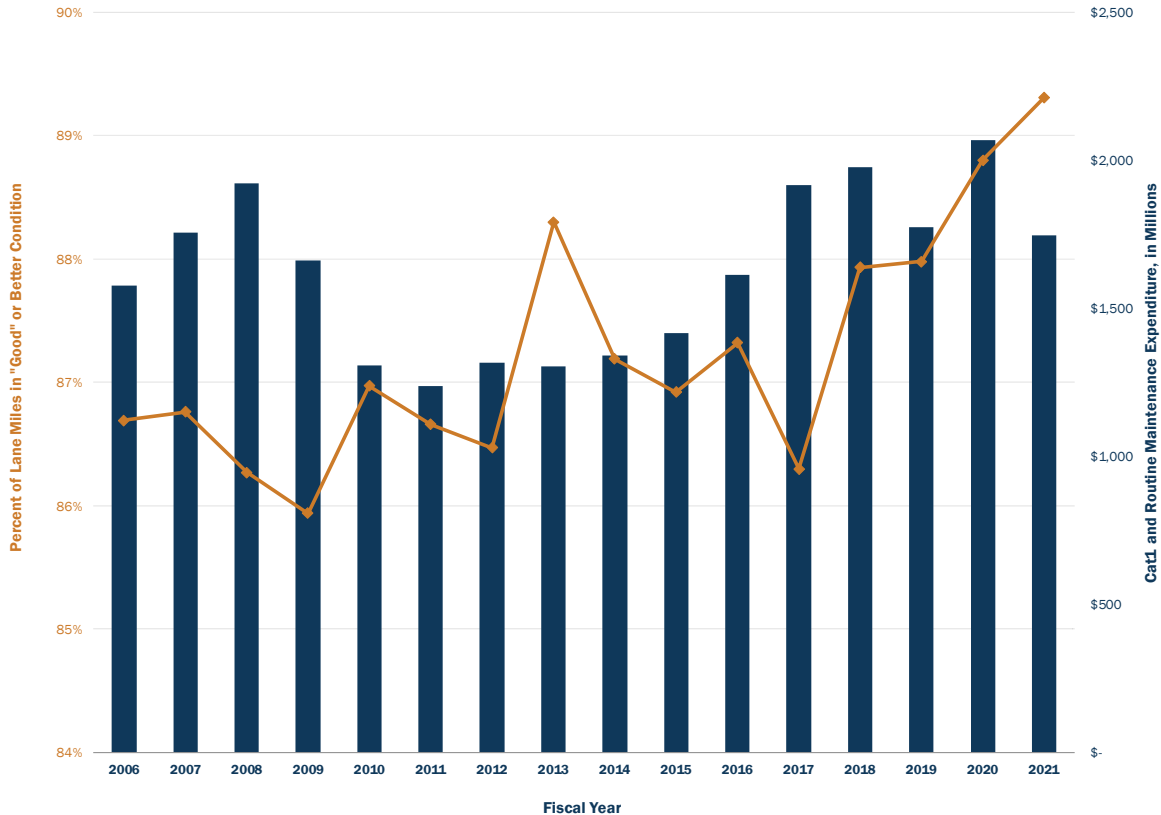


Figure 3. Statewide Percentage “Good” or Better and Maintenance Expenditure in FY 2006-2021

Definitions

“Distress,” “Ride Quality,” and “Condition” Definitions

Distress refers to various types of pavement deterioration (such as ruts, cracks, potholes/failures, and patches). It can be subdivided into “Shallow Distress” and “Deep Distress.”

Shallow Distress refers to distress types which usually can be repaired by surface-type preventive maintenance. “Shallow” distress types are:

| Shallow Distress Types, By Pavement Type | | |
|--|------------------|--------------------------|
| ACP | CRCP | JCP |
| Shallow Rutting | Spalled Cracks | Failed Joints and Cracks |
| Patching | Concrete Patches | Concrete Patches |
| Block Cracking | | |
| Transverse Cracking | | |

Deep Distress refers to distress types which usually require sub-surface rehabilitation. “Deep” distress types are:

| Deep Distress Types, By Pavement Type | | |
|---------------------------------------|-----------------|--------------------------------|
| ACP | CRCP | JCP |
| Deep Rutting | Punchouts | Failures |
| Failures | Asphalt Patches | Shattered Slabs |
| Alligator Cracking | | Slabs with Longitudinal Cracks |
| Longitudinal Cracking | | |

Ride Quality refers to the smoothness of the pavement surface.

Condition is a mathematical combination of the “Distress” and “Ride Quality” data that describes perception of pavement quality.

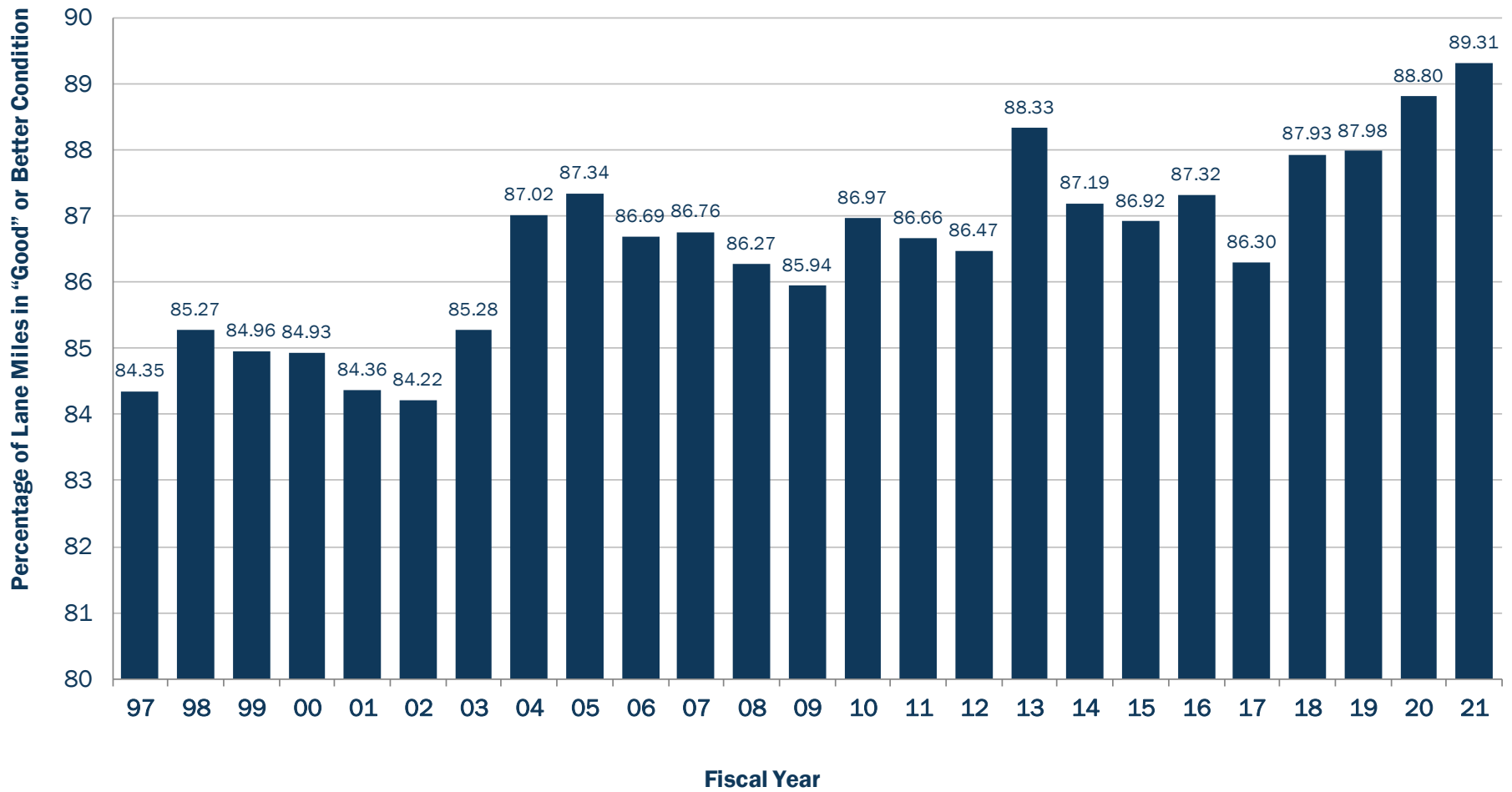
PMIS Score Definitions

Please note that a pavement section with Condition Score of 70 or above is considered to be in “Good” or better condition.

| Category | Distress Score (describes “distress”) | Ride Score (describes “ride”) | Condition Score (describes “condition”) |
|-------------|--|----------------------------------|--|
| “Very Good” | 90 to 100 | 4.0 to 5.0 | 90 to 100 |
| “Good” | 80 to 89 | 3.0 to 3.9 | 70 to 89 |
| “Fair” | 70 to 79 | 2.0 to 2.9 | 50 to 69 |
| “Poor” | 60 to 69 | 1.0 to 1.9 | 35 to 49 |
| “Very Poor” | 1 to 59 | 0.1 to 0.9 | 1 to 34 |

Status of Statewide Pavement Condition

Statewide Pavement Condition, FY 1997-2021



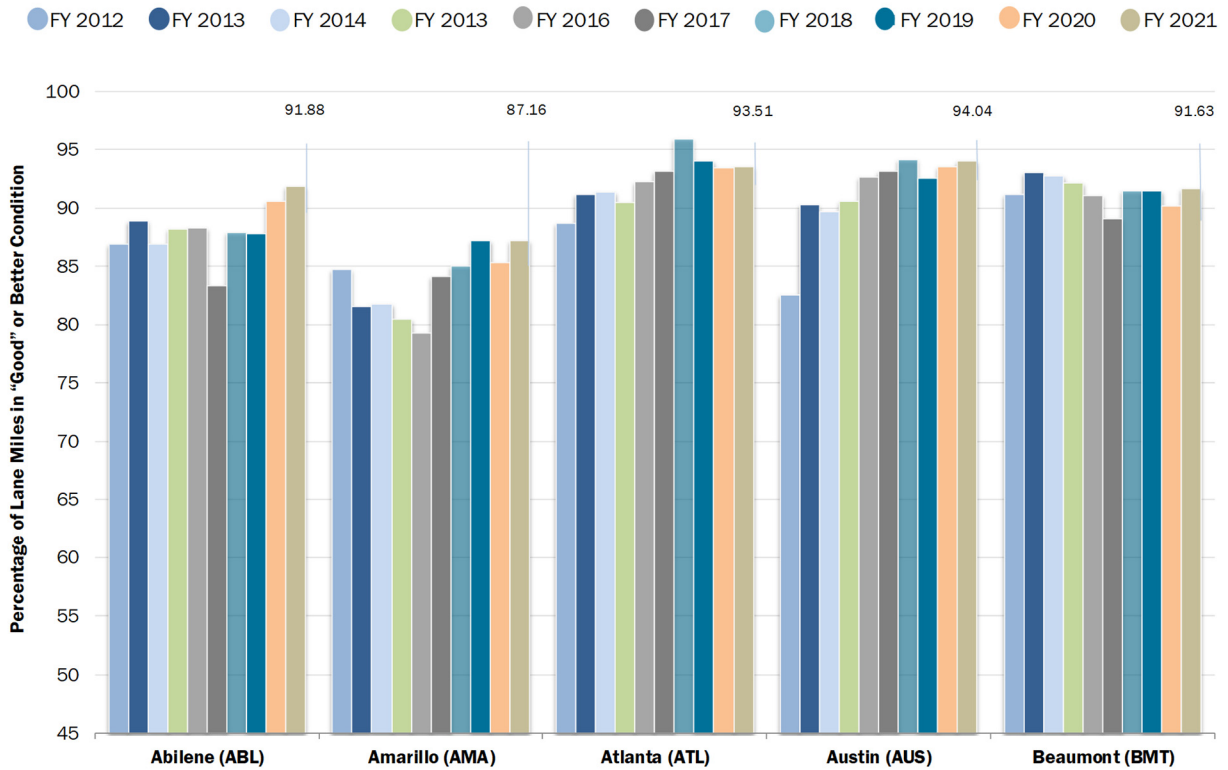
Status of Statewide Pavement Condition, FY 2011-2021

| District | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Change FY 2019-2020 |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------|
| Abilene (ABL) | 88.79 | 86.91 | 88.86 | 86.93 | 88.21 | 88.26 | 83.30 | 87.86 | 87.84 | 90.62 | ▲ 2.78 |
| Amarillo (AMA) | 86.13 | 84.69 | 81.57 | 81.72 | 80.44 | 79.29 | 84.17 | 85.03 | 87.18 | 85.37 | ▼ -1.81 |
| Atlanta (ATL) | 91.38 | 88.68 | 91.18 | 91.35 | 90.46 | 92.24 | 93.10 | 95.93 | 94.05 | 93.46 | ▼ -0.59 |
| Austin (AUS) | 85.04 | 82.58 | 90.23 | 89.64 | 90.57 | 92.68 | 93.19 | 94.15 | 92.60 | 93.53 | ▲ 0.93 |
| Beaumont (BMT) | 89.97 | 91.21 | 93.06 | 92.75 | 92.13 | 91.06 | 89.06 | 91.42 | 91.51 | 90.19 | ▼ -1.32 |
| Brownwood (BWD) | 95.34 | 92.47 | 94.22 | 92.87 | 91.75 | 94.04 | 92.82 | 93.18 | 91.72 | 94.04 | ▲ 2.32 |
| Bryan (BRY) | 87.49 | 83.80 | 86.46 | 86.97 | 84.16 | 85.01 | 86.04 | 89.46 | 90.21 | 89.35 | ▼ -0.86 |
| Childress (CHS) | 87.67 | 91.12 | 93.96 | 92.06 | 92.65 | 92.12 | 90.42 | 95.46 | 96.10 | 96.08 | ▼ -0.02 |
| Corpus Christi (CRP) | 83.15 | 78.15 | 80.19 | 79.79 | 79.86 | 76.72 | 83.62 | 87.15 | 85.95 | 87.11 | ▲ 1.16 |
| Dallas (DAL) | 76.13 | 75.63 | 76.76 | 73.76 | 78.23 | 78.03 | 73.93 | 76.45 | 77.51 | 81.02 | ▲ 3.51 |
| El Paso (ELP) | 90.54 | 90.34 | 91.79 | 90.71 | 90.95 | 88.86 | 84.18 | 86.82 | 85.18 | 83.70 | ▼ -1.48 |
| Fort Worth (FTW) | 86.70 | 87.79 | 89.76 | 86.51 | 86.26 | 86.80 | 83.89 | 82.39 | 84.71 | 85.31 | ▲ 0.60 |
| Houston (HOU) | 75.09 | 79.75 | 83.84 | 80.57 | 81.07 | 83.28 | 79.16 | 82.89 | 84.10 | 85.54 | ▲ 1.44 |
| Laredo (LRD) | 74.64 | 81.78 | 80.35 | 84.48 | 83.89 | 86.11 | 88.26 | 86.37 | 88.03 | 87.78 | ▼ -0.25 |
| Lubbock (LBB) | 86.40 | 87.90 | 88.73 | 90.96 | 89.99 | 89.90 | 87.91 | 86.08 | 87.70 | 90.45 | ▲ 2.75 |
| Lufkin (LFK) | 88.62 | 88.96 | 92.01 | 90.28 | 90.83 | 92.67 | 93.63 | 95.54 | 95.09 | 94.99 | ▼ -0.10 |
| Odessa (ODA) | 94.14 | 95.45 | 94.26 | 93.66 | 90.84 | 87.73 | 84.76 | 85.10 | 82.28 | 81.61 | ▼ -0.67 |
| Paris (PAR) | 82.68 | 81.36 | 87.15 | 85.58 | 85.80 | 84.41 | 81.24 | 86.88 | 85.58 | 88.43 | ▲ 2.85 |
| Pharr (PHR) | 82.64 | 86.55 | 88.78 | 89.67 | 91.52 | 91.63 | 93.40 | 90.68 | 91.02 | 89.09 | ▼ -1.93 |
| San Angelo (SJT) | 95.11 | 95.15 | 95.45 | 94.71 | 92.13 | 91.80 | 87.08 | 91.71 | 90.43 | 92.63 | ▲ 2.20 |
| San Antonio (SAT) | 86.51 | 84.67 | 86.09 | 81.41 | 79.02 | 80.13 | 81.67 | 80.69 | 81.83 | 83.80 | ▲ 1.97 |
| Tyler (TYL) | 94.77 | 93.75 | 94.32 | 91.57 | 91.43 | 91.31 | 86.38 | 90.58 | 89.55 | 88.39 | ▼ -1.16 |
| Waco (WAC) | 85.95 | 84.76 | 88.10 | 88.37 | 86.79 | 91.69 | 89.58 | 89.42 | 89.60 | 91.62 | ▲ 2.02 |
| Wichita Falls (WFS) | 92.60 | 92.43 | 93.20 | 92.76 | 92.16 | 92.79 | 90.27 | 92.27 | 91.79 | 93.65 | ▲ 1.86 |
| Yoakum (YKM) | 88.17 | 86.63 | 87.63 | 84.29 | 84.85 | 87.00 | 90.70 | 91.63 | 91.32 | 92.13 | ▲ 0.81 |
| Statewide (ALL) | 86.66 | 86.47 | 88.30 | 87.19 | 86.92 | 87.32 | 86.30 | 87.93 | 87.98 | 88.80 | ▲ 0.82 |

“Good or better condition” is Pavement Management Information System (PMIS) Condition Score greater than or equal to 70.

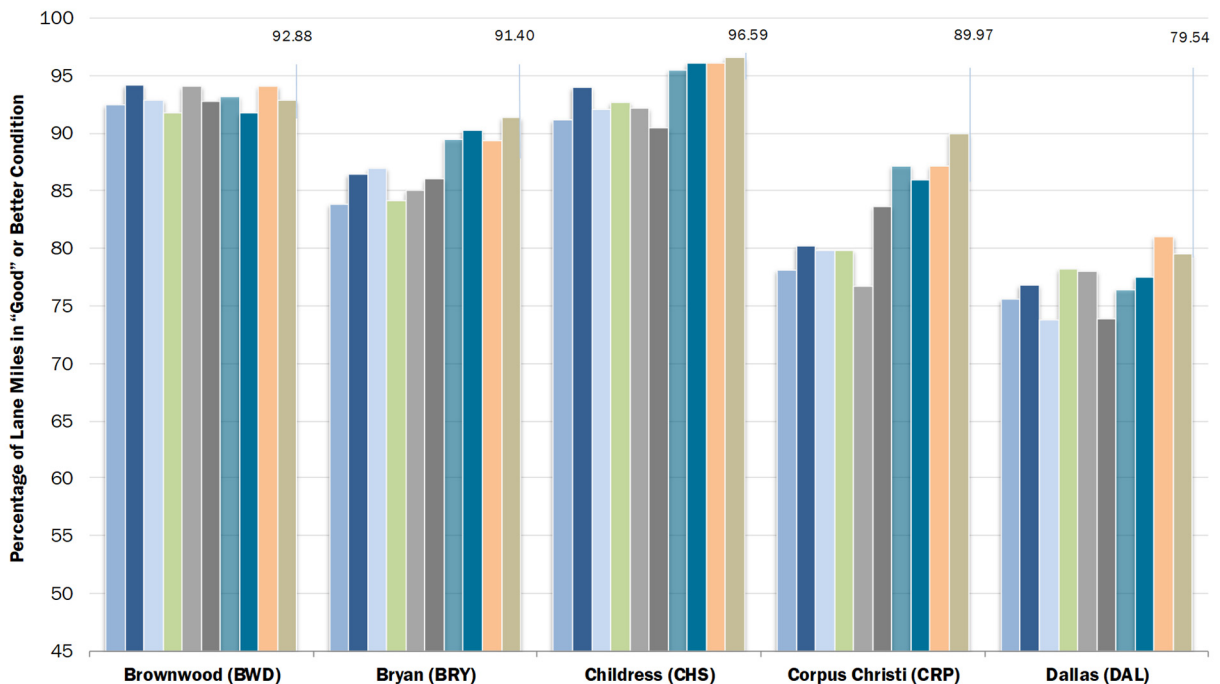
Pavement Condition Trends, by District, FY 2012-2021

(Abilene through Beaumont)



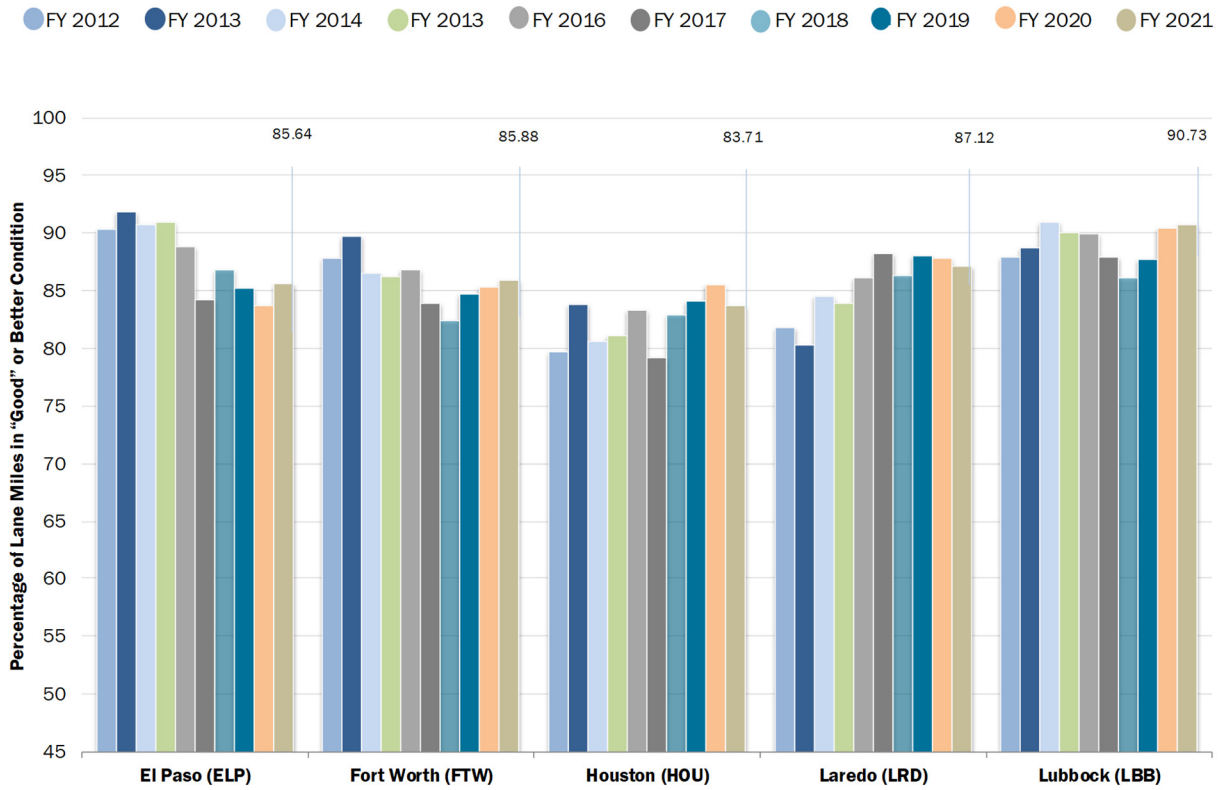
Pavement Condition Trends, by District, FY 2012-2021

(Brownwood through Dallas)



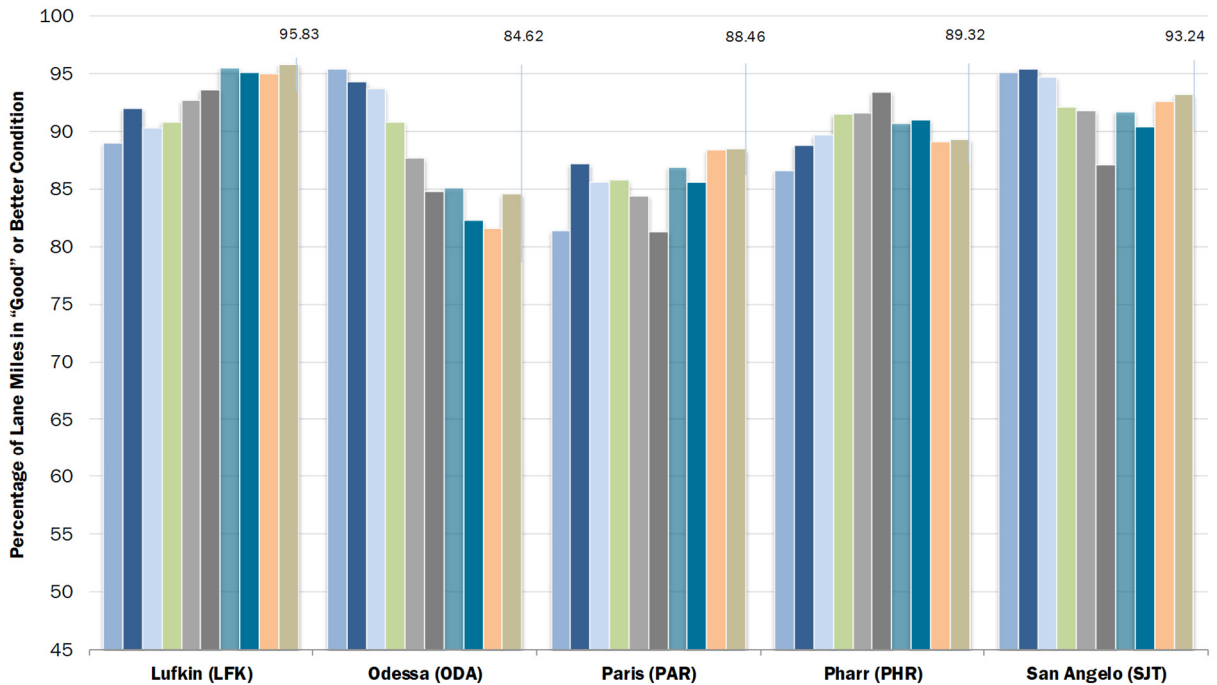
Pavement Condition Trends, by District, FY 2012-2021

(El Paso through Lubbock)



Pavement Condition Trends, by District, FY 2012-2021

(Lufkin through San Angelo)



Pavement Condition Trends, by District, FY 2012-2021

(San Antonio through Yoakum)

